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**Note on a reassessment of the taxonomic status of  
*Mikadotrochus oishii* Shikama, 1973,  
a pleurotomariid (Mollusca: *Pleurotomariidae*)  
from the East China Sea**

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**KEYWORDS.** Mollusca, Vetigastropoda, Pleurotomariidae, *Mikadotrochus*, East China Sea, valid species.

**ABSTRACT.** The status of the taxon, *Mikadotrochus oishii* Shikama, 1973 (Mollusca: Pleurotomariidae), from the East China Sea, formerly synonymized with *Mikadotrochus hirasei*, is discussed on the basis of a re-evaluation of its shell morphology. Detailed comparative study of older and more recent “*oishii*” material with closely allied species, like *Mikadotrochus hirasei* (Pilsbry, 1903) and *Bayerotrochus teramachii* (Kuroda, 1955), resulted in confirmation of distinctive shell characters, as mentioned by Shikama such as: fine spiral sculptural pattern on teleoconch, basal disc and selenizone; color pattern and surface brilliance. A few additional distinctive characters including the profile of the apical whorls and weight (expressing shell thickness) could also be used to differentiate *M. oishii* from the other taxa.

**RESUME.** *Mikadotrochus oishii* Shikama, 1973 de la Mer de Chine Orientale est examiné sur base d’une réévaluation de ses caractères morphologiques. Une étude comparative détaillée de matériel ancien et plus récent de « *oishii* » avec des espèces voisines telles que *Mikadotrochus hirasei* (Pilsbry, 1903) et *Bayerotrochus teramachii* (Kuroda, 1955) confirme les caractères conchyliologiques distinctifs, déjà mentionnés par Shikama tels que : la sculpture finement spiralée de la téléoconque, du disque basal et de la selenizone ; la couleur et le degré de brillance de la surface. Quelques caractères additionnels, comme le profil des tours apicaux et le poids (comme mesure de l’épaisseur de la coquille) pourraient être utilisés pour différencier *M. oishii* des autres taxa.

## INTRODUCTION

After the original description of *Mikadotrochus oishii* by Tokio Shikama (1973) based on two specimens originating from the East China Sea, from the collection of Mrs. T. Oishi, with shell characters very close to both *Mikadotrochus hirasei* (Pilsbry, 1903) and *Bayerotrochus teramachii* (Kuroda, 1955), it was synonymised with *M. hirasei* by several authors, including Okutani (1987) and Moolenbeek & Coomans (1978).

Anseeuw & Goto (1996: Appendix 1) mentioned two species of uncertain status, without resolving their taxonomic status, awaiting further material to allow a clear resolution of its identity. One of these species was *Perotrochus oishii* (Shikama, 1973), the other,

*Mikadotrochus hirasei yamamotoi* Yamamoto, 1973, is probably conspecific with *M. oishii*.

In the original description Shikama speculated on the “hybrid” character (*hirasei* X *teramachii*) of his taxon, due to some conchological characters shared with each of these species. This hypothesis could be held open, awaiting the availability of preserved soft parts for genetic sequencing studies, but in the past thirty years this opportunity has not yet occurred.

Since Anseeuw & Goto (1996) placed *Mikadotrochus oishii* in *Perotrochus*, a possible “hybridisation” between *P. hirasei* and *P. teramachii*, seemed plausible at the time.

In the interim Harasewych (2002), placed *Mikadotrochus hirasei* and *Bayerotrochus teramachii* in separate genera based on a combination of shell

and anatomical features, as well as unique differences in their DNA sequences coding for the rDNA gene. It is unlikely that hybridisation would occur between species from two different genera !

In recent years several more specimens attributed to “*M. oishii*” have become available, originating from Taiwanese or mainland China fisherman, but with imprecise locality data, namely “the East China Sea”. Thanks to the kindness of Mrs. T. Oishi from Nagasaki, a paratype was made available to the present authors for further comparative study. (See Figs. 1, 3 and 4)

Another recently collected specimen, with similar characters, was loaned kindly by Mr. J. Conde (Spain) for identification and study. (See Fig.2)

Finally a large live trawled specimen, originating from Taiwanese trawlers (commercial sources) was added to the collection of P. Anseeuw.

After detailed comparison of these specimens, with large available series of *M. hirasei* and *B. teramachii* from different localities in our collection (Anseeuw & Goto, 1996), covering its large distributional area, we were convinced that a subtle, but consistent set of conchological differences could be observed, that were not present in either *M. hirasei* or *B. teramachii* specimens, and could sustain the validity of a separate taxon: *Mikadotrochus oishii* Shikama, 1973.

## SYSTEMATICS

Order **VETIGASTROPODA** Salvini – Plawen, 1980.

Superfamily **PLEUROTOMARIOIDEA** Swainson, 1840.

Family **PLEUROTOMARIIDAE** Swainson, 1840

Genus *Mikadotrochus* Lindholm, 1927.

Type species: *Mikadotrochus beyrichii* (Hilgendorf, 1877) (by original designation).

*Mikadotrochus oishii* Shikama, 1973

Figs 1-4

*Mikadotrochus oishii* Shikama, 1973: 1, text figs. 1-2, pl.1, figs. 1-2.

*Mikadotrochus hirasei* – Habe, 1978: 47 [NOT *M. hirasei* (Pilsbry, 1903)]

*Mikadotrochus hirasei* – Moolenbeek & Coomans, 1978: 763 [NOT *M. hirasei* (Pilsbry, 1903)]

*Mikadotrochus hirasei* – Okutani, 1987: 60 [NOT *M. hirasei* (Pilsbry, 1903)]

*Mikadotrochus oishii* – Yamamoto, 1993: 60 fig. 11

*Mikadotrochus hirasei yamamotoi* Yamamoto, 1993: 61 fig. 12

*Perotrochus oishii* – Anseeuw & Goto, 1996: 174 plate 175

*Perotrochus hirasei yamamotoi* – Anseeuw & Goto, 1996: 176 plate 177

## Material examined

*Mikadotrochus oishii* Shikama, 1973

1 paratype from the collection of Mrs. Oishi (Japan): max. basal diameter: 92.5 mm; Height: 75.9 mm; slit width: 3.04 mm; depth slit along upper margin: 56.8 mm; depth slit along lower margin: 38.3 mm; weight: 52 g; mean apical angle: 86°; no operculum preserved.

West of Amami O Shima Island, East China Sea.

1 specimen collection Mr. J. Conde (Spain): max. basal diameter: 110.3 mm; height: 96.4 mm; slit width: 5.08 mm; depth slit along upper margin: 65.2 mm; depth slit along lower margin: 45.5 mm; weight: 95.5 g; mean apical angle: 80°; operculum: 15.3 mm; apertural width: 54 mm.

Trawled by Taiwanese fisherman probably off Pescadores Islands.

1 specimen collection P. Anseeuw (Belgium): max. basal diameter: 129.0 mm; height: 115.6 mm; slit width: 6.62 mm.; depth slit along upper margin: 78.50 mm; depth slit along lower margin: 54.50 mm; weight: 138 g; mean apical angle: 84°; operculum: 29.30 mm; apertural width: 64 mm.

Trawled by Taiwanese fisherman, without precise locality data. (commercial sources)

*Bayerotrochus teramachii* (Kuroda, 1955) (Figs 7-8).

1 specimen collection Mrs. Oishi (Japan): max. basal diameter: 98.96 mm.; Height: 83.0 mm; slit width: 6.25 mm; depth slit along upper margin: 59.34 mm; depth slit along lower margin: 41.83 mm; weight: 39.5g; no operculum recovered. Trawled off East China Sea.

## Figures 1 - 8

1-4. *Mikadotrochus oishii* Shikama, 1973

1. coll. T. Oishi, 92,5 mm. Profile view; 2. coll. J. Conde, 110,3 mm. Profile view; 3. apical whorls (coll. T. Oishi); 4. selenizone & sculpture (coll. T. Oishi).

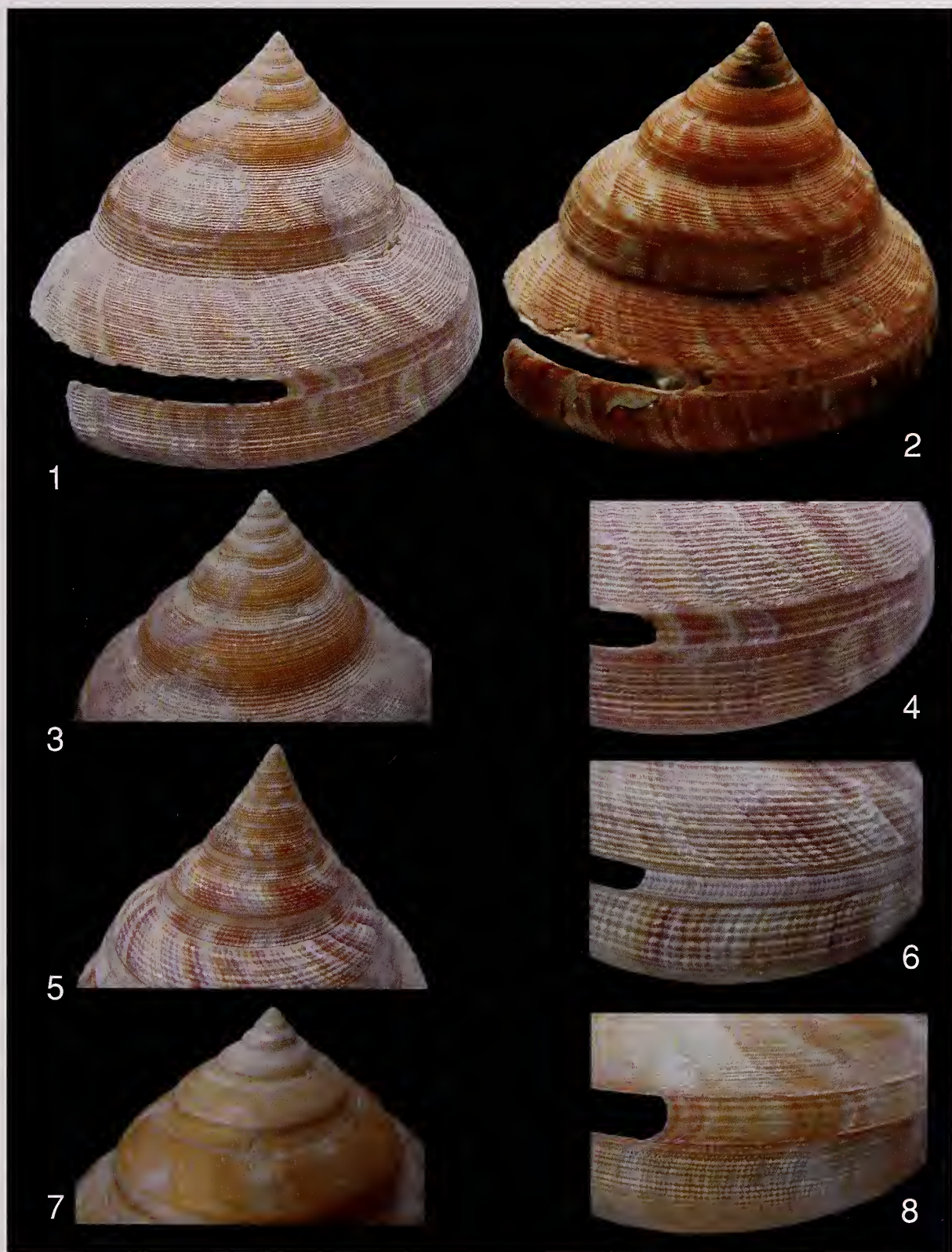
5-6. *Mikadotrochus hirasei* (Pilsbry, 1903)

5. coll. T. Oishi, 89 mm. Apical whorls; 6. Selenizone & sculpture.

7-8. *Bayerotrochus teramachii* (Kuroda, 1955)

7. coll. T. Oishi, 98 mm. Apical whorls; 8. Selenizone & sculpture.







**Additionnal *B. teramachii* material examined** (all coll. P. Anseeuw): off Goto Retto Is., Nagasaki, Japan, trawled 150 m; off Kuro Is., S.W. of Kagoshima City, E. China Sea, trawled 300-380 m; off Da Nang, North Vietnam, trawled 250-280 m; off Vung Tau, Vietnam, South China Sea, trawled 130m; off S.W. Taiwan Strait, trawled over 180 m; off North Taiwan, trawled 200-300 m; south of Daio-Zaki, Mie Prefecture, Japan, trawled 240 m; south of Cape Makurazaki, near Kuroshima Is., Kagoshima Pref., Japan, trawled 150 m; off MacIsfield Bank, 16°N, 115 E, South China Sea, trawled 300 m; off Spratly Is., South China Sea, 9°10'N, 112°0'E, trawled 320 m; off Panglao, Bohol Is., Philippines, from tangle nets; west of Pratas Is., South China Sea, trawled 300 m; off Tanegashima Is., Japan, trawled 200 m.

*Mikadotrochus hirasei* (Pilsbry, 1903) (Figs 5-6)

1 specimen collection Mrs. Oishi (Japan): max. basal diameter: 89.92 mm; Height: 80.0 mm; slit width: 3.16 mm; depth slit along upper margin: 53.12 mm; depth slit along lower margin: 36.64 mm; weight: 63.0 g; no operculum recovered.

Trawled off East China Sea.

**Additionnal *M. hirasei* material examined** (all coll. P. Anseeuw): off Ukijima, Nagasaki, Japan, trawled 200-250 m; off Yuzaki, Shirahama-cho, Wakayama Pref., Japan, trawled 150 m; off Saint- Espriet Bank, E.N.E. of Hainan Is., South China Sea, by submersible in 260 m; off Choshi, Kanagawa, Chiba Pref., Japan, trawled 180-200 m; off Danjo Gunto, Nagasaki-ken, Japan, trawled 220-230 m; off N.E. Taiwan, trawled 150 m; N.W. of Amami-o-shima Is., Japan, trawled 160-200 m; off Ukujima, Goto Retto, Nagasaki Ken, Japan, trawled 150-180 m; off Spratly Is., Vietnam, South China Sea, trawled in 200-300 m; off Pescadores Is., Taiwan Strait, Taiwan, trawled 200-300 m; off Senkaku Is., East China Sea, trawled 150 m.

**Discussion.** The major differences in shell morphology between *M. hirasei*, *B. teramachii* and *M. oishii* are summarised in the Comparative Table below.

Color photographs (Figs.1-8) illustrate some distinctive features, like general profile, color and fine sculpture of teleoconch, apical whorl profile and close up views of selenizone surface, width and sculpture, between *M. oishii* and the closely related *M. hirasei* and *B. teramachii*.

For color photographs of the holotype of *M. oishii*, we refer to Yamamoto (1993) or to Anseeuw & Goto (1996).

It is clear that taken separately, no single shell character of *M. oishii* mentioned, is sufficient to allow immediate separation with the two species: *M. hirasei* and *B. teramachii*.

We also acknowledge that a number of shell characters, like the general shape of the teleoconch, the callus pad covering surface or the sunken selenizone will be easily recognised also in many *M. hirasei* specimens, and that the slit position on the body whorl, the sculptural pattern on the whorls, the general color and even the surface brilliance are all suggestive characters for *B. teramachii* specimens.

However if we combine a set of shell characters like the convex shape of the apical whorls (see close up photo), the solid, thick shell construction, the sunken selenizone with its 3 cords (see color plate) and the very fine spiral sculpture on the whorls (see color plate) it forms a unique combination only encountered in the *M. oishii* specimens, and as a combined set of shell characters not seen in *M. hirasei* nor *B. teramachii* specimens.

The operculum unfortunately was not recovered in this original material from Mrs. Oishi, here studied, and although present in the other specimens, their sizes are very different in proportion to the apertural size of each specimen. (In the Condé specimen the closure of the aperture by the operculum is 28,3% and in the Anseeuw specimen it is quite larger: 45,8% of the greatest diameter of the aperture.) The fact that both specimens are from commercial origin, and that therefore the right opercula are not always put together with the corresponding specimens, we prefer to wait for fully preserved material before using this taxonomic criterion.

Preserved soft parts and original opercula of those scarce specimens are thus badly needed, particularly for determining the exact generic status of this species, here only retained in the genus *Mikadotrochus* on basis of distinctive morphological shell characters measured on a very limited number of specimens, in comparison to the large numbers available both in *M. hirasei* and *B. teramachii*. These characters lay mainly on the general conical shell profile, with regularly increasing whorl construction, without inflated body whorl (a character typical for *Bayerotrochus*), the relatively thick shell, the slit position below mid-whorl and the thick twisted columella.

**Comment.** It is understandable due to the scarcity of "*oishii*" materials over the years, that probably several specimens belonging to *M. oishii* were actually confounded with either *M. hirasei* or *B. teramachii* in many private and museum collections over the world.

Therefore we would be most grateful for the help of our readers on any information, photographs, or actual specimens, which could be forwarded to the present authors for further identification and evaluation of the validity of the distinctive shell characters here retained, since it would be based then on a greater number of *M. oishii* specimens and therefore give definitive outcome on the generic and

specific status of *Mikadotrochus oishii* Shikama, 1973.

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We wish to thank heartily Mrs. T. Oishi (Nagasaki, Japan) for her kindness in transferring to us important original material, including *M. oishii*, *M. hirasei* and *B. teramachii* for comparative study. We also thank Mr. J. Conde (Spain) for having permitted us to study his pleurotomariid specimen with intermediate shell characters, before further settlement of its real identity was decided.

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Distinctive morphological shell characters	<i>Mikadotrochus hirasei</i> (Pilsbry, 1903) *	<i>Mikadotrochus oishii</i> Shikama, 1973	<i>Bayerotrochus teramachii</i> (Kuroda, 1955) *
General appearance adult teleoconch shape (see photographs)	Regularly increasing whorl construction (body-whorl not inflated)	Regularly increasing whorl construction (Figs. 1 – 2)	Highly inflated body whorl construction
Mean angle teleoconch	72°	80° - 86°	98°
Apical whorl profile (see photographs)	Acute sharp / straight conical (with whitish cord protruding on surface) (Fig. 4)	More depressed trochiform (Fig. 3)	More depressed trochiform (Fig. 5)
protoconch	Ivory white / smooth	White / smooth	Ivory white / sculptured
Profile / shape basal disc	More flattened (only slightly convex)	Gently convex	Clearly very convex
Surface of umbilical callus pad on basal disc	37 % - 40 % very large (keeled)	28 % - 37 % large	22 % small
Aperture (inner slit lips)	Thick nacreous layer (with greenish shade) no sculpture visible	Thin nacreous layer (with greenish-pink overtones) some sculpture is visible	Thin nacreous layer with cancellate sculptural pattern visible
Slit position on body whorl (in adults)	Below mid whorl	Just below midwhorl	On midwhorl or just above
Selenizone on body whorl (see photographs)	Flush to slightly convex (never concave); narrow; with 3 cords (Fig. 7)	Slightly sunken; intermediate width; with 3 cords (Fig. 6)	Concave; very large; with 4 – 5 cords (Fig. 8)
Sculpture on body whorl of adult shell	Heavily pearl shaped beaded spiral cords; 20 above and 10 below the selenizone (Fig. 7)	Numerous very fine, minutely beaded spiral cords (stronger granulation below selenizone); 25 above and 15 – 16 below the selenizone (Fig. 6)	Cancellated surface through intersection of spiral cords and axial growth lines; 30 above and 17 – 19 below the selenizone (Fig. 8)
Color pattern teleoconch	Axial crimson flammules, with more checker board pattern below selenizone	Near solid light orange; no checkerboard pattern below selenizone (Figs. 1 – 2)	Solid golden yellow, with sometimes very faint irregular small axial deep orange red flammules
Surface brilliance teleoconch	dull	Upper whorls slightly lustrous (Figs. 1 – 2)	Some specimens have lustrous shell surface
Columella	Thick and twisted	Thick and twisted	Thin and twisted
Weight expressing shell thickness	Heavy, solid thick shell (++++ )	Solid shell construction, with intermediate weight in relation to shell size (++)	Lighter and thinner shell (+)

**Table 1. Distinctive morphological shell characters.**

\* Comparative shell characters, as mentioned in the diagnosis section of both species in Anseeuw & Goto ( 1996 )